

# Clinical Laboratory Practices for the Identification of Shiga toxin-producing *Escherichia coli* in FoodNet Sites



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## Updated Abstract

**Background** Shiga toxin-producing *Escherichia coli* (STEC) strains cause diarrheal illness and are associated with serious disease and disability, such as hemolytic uremic syndrome. The most common STEC, *E. coli* O157:H7, has been recognized as a foodborne pathogen since 1982. More recently, non-O157 STEC have been recognized as an important cause of diarrheal illness. Changes in clinical laboratory practices and new testing methodologies could influence trends in laboratory-based surveillance for STEC.

**Methods** In 2003 microbiologists in the clinical laboratories in nine FoodNet sites (CA, CO, CT, GA, MD, MN, OR, NY, TN) were surveyed about their laboratory practices for identification of STEC. The survey addressed practices related to culture- and non-culture-based methods.

**Results** Responses were received from 498 (95%) of 523 laboratories surveyed. Preliminary analysis show that among the 459 (92%) laboratories that reported testing stool specimens for O157/STEC, 321 (70%) tested on-site. Of the 302 (94%) laboratories reporting testing on-site using culture methods, 211 (70%) tested routinely for *E. coli* O157 and 236 (78%) send isolates to the state public health laboratory (PHL) or reference lab for further testing or confirmation. Of the 29 (9%) laboratories using non-culture methods, 6 (21%) reported doing so routinely; 17 (59%) use an EIA (enzyme immunoassay) method. Twenty-four (83%) send either a Shiga toxin-positive isolate or broth to the state PHL for confirmation and serotyping. Regional differences were noted in the number of specimens tested on-site, determinants of testing and methodologies used.

**Conclusions** Despite the public health importance of non-O157 STEC, utilization of testing methods for their identification remains low. Serotyping of STEC isolates is vital in determining the burden of disease caused by non-O157 STEC as well as detecting and investigating possible outbreaks. Clinical laboratories should be encouraged to test stool specimens for non-O157 STEC and all positive isolates should be serotyped, whether on-site or at the state PHL. Further studies are needed to determine if STEC surveillance has been impacted as laboratories adopt new measures in STEC testing.

## Background

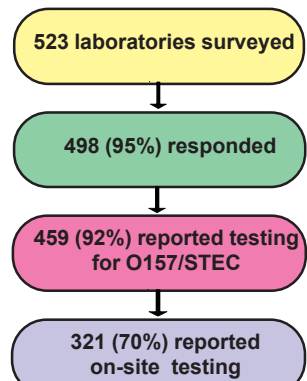
- Shiga toxin-producing *Escherichia coli* (STEC) strains cause diarrheal illness and are associated with serious disease and disability, such as hemolytic uremic syndrome
- The most common STEC, *E. coli* O157:H7, has been recognized as a foodborne pathogen since 1982
- More recently, non-O157 STEC have been recognized as an important cause of diarrheal illness
- Changes in clinical laboratory practices and new testing methodologies could artifactually influence trends in data obtained from laboratory-based surveillance for STEC

## Methods

- In 2003 microbiologists in the clinical laboratories in nine FoodNet sites (CA, CO, CT, GA, MD, MN, OR, NY, TN) were surveyed about their laboratory practices for identification of STEC
- The survey addressed practices related to culture- and non-culture-based methods
  - media/methods used
  - circumstances for testing
    - all stool specimens routinely
    - when specimen appears bloody
    - history of bloody stools
    - certain age group
    - season (i.e., summer)
    - HUS
  - additional testing/follow up
- Data were analyzed using SAS 8.2

## RESULTS

### Response Rate



### Number of Laboratories Testing On Site and Methods Used, by FoodNet Site

Site	Laboratories Testing (n)	On Site n (%)	Culture n (%)	Non-Culture n (%)
California	25	23 (92)	22 (96)	0
Colorado	19	17 (90)	14 (82)	4 (24)
Connecticut	31	29 (94)	26 (90)	7 (24)
Georgia	67	50 (75)	44 (88)	5 (10)
Maryland	50	31 (62)	28 (90)	3 (10)
Minnesota	125	72 (58)	72 (100)	2 (3)
New York	33	32 (97)	31 (97)	3 (9)
Oregon	61	44 (72)	43 (98)	3 (7)
Tennessee	48	23 (48)	22 (96)	2 (9)
TOTAL	459	321* (70)	302 (94)	29 (9)

\* 19 labs use both culture and non-culture methods

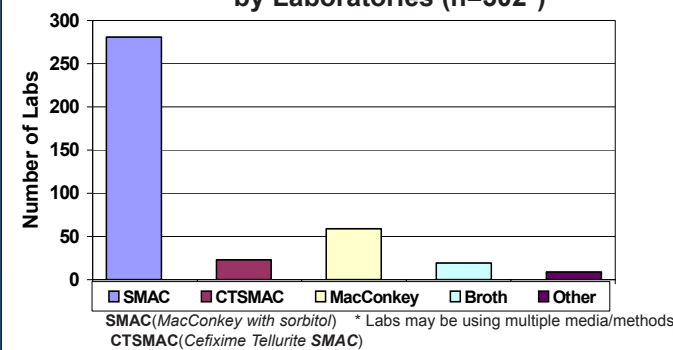
- Of the 321 labs testing on site for STEC:
  - 2% (6) routinely use a test method that would detect non-O157 STEC

- Of the 29 labs using non-culture methods:
  - 83% (24) routinely send an isolate or broth to the state PHL for confirmation and serotyping

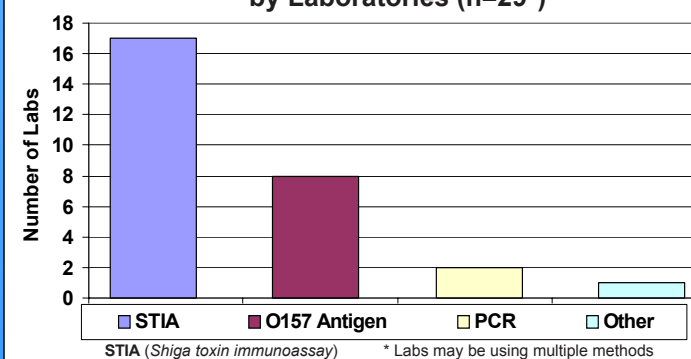
## Conclusions and Recommendations

- Utilization of testing methods for identification of non-O157 STEC is low, despite their public health importance
  - Only 2% of labs testing on site routinely use a method that would detect non-O157 STEC
- Burden of disease caused by non-O157 STEC cannot be measured unless laboratories employ testing methods for their identification
- Clinical laboratories should be encouraged to test stool specimens for non-O157 STEC
- Testing for non-O157 STEC and serotyping of isolates is vital in detecting and investigating possible outbreaks
- Further studies are needed to determine the impact changing laboratory practices have on surveillance data and trends in STEC

### Culture Media/Methods Used by Laboratories (n=302\*)



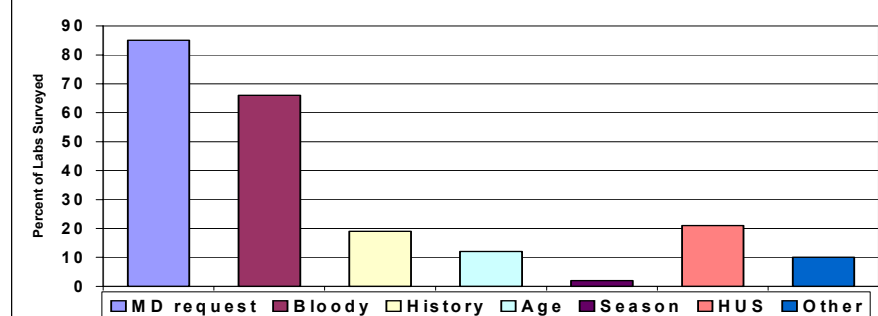
### Non-Culture Methods Used by Laboratories (n=29\*)



### Reasons for Testing Using Culture-based Methods

- Of the 302 labs that use culture-based methods, 70% (211) routinely test all specimens
- The remaining 30% (91) use culture-based methods under certain circumstances

### Circumstances for Testing (n=91)



### Reasons for Testing Using Non-Culture Methods

- Of the 29 labs that do non-culture based testing, 21% (6) routinely test all specimens
- The remaining 79% (23) use non-culture based methods under certain circumstances

### Circumstances for Testing (n=23)

